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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,020	10/30/2000	Naoya Tokunaga	2000-1507A	5165

7590 07/30/2004  
Wenderoth Lind & Ponack LLP  
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EXAMINER

PERILLA, JASON M

ART UNIT	PAPER NUMBER
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2634

9

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/698,020

Applicant(s)

TOKUNAGA ET AL.

Examiner

Jason M Perilla

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 5-24 and 27-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 25 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7-8/02 8-7/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. Claims 1-34 are pending in the instant application.

***Election/Restrictions***

2. This application contains claims directed to the following patentably distinct species of the claimed invention:

- I. Embodiment 1: Figures 1-3; claims 1-4, 25, and 26.
- II. Embodiment 2: Figure 4; claims 5-7 and 27.
- III. Embodiment 3: Figure 6; claims 8-10 and 28-29.
- IV. Embodiment 4: Figure 8; claims 11-13.
- V. Embodiment 5: Figure 9; claims 14-16.
- VI. Embodiment 6: Figure 11; claims 17-19.
- VII. Embodiment 7: Figure 13; claims 20, 21, 30, 31.
- VIII. Embodiment 8: Figure 15; claims 22 and 32.
- IX. Embodiment 9: Figure 17; claims 23-24 and 33-34.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claims are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

3. During a telephone conversation with Johnathan R. Bowser on July 14, 2004 a provisional election was made without traverse to prosecute the invention of embodiment 1, claims 1-4, 25 and 26. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-24, and 27-34 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Claims 1-4, 25 and 26 remain pending in the instant application.

***Priority***

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

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6. The information disclosure statements (IDS) submitted on August 26, 2002 (paper 7 in the file) and July 3, 2003 (paper 8 in the file) are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

***Specification***

7. The reference to 1091 (pg. 2, line 3) in the specification should be replaced by – 1901—to correctly match the reference numerals of figure 19.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Admitted Prior Art according to figure 19 (hereafter "AAPA") in view of Love (US 5818876).

Regarding claim 1, the AAPA discloses by figure 19 a waveform equalization controller which comprises a waveform equalizer for reducing a transmission line distortion of an input signal on the basis of LMS algorithm, and controls update of a tap coefficient of a filter included in the waveform equalizer (fig. 19; specification pgs. 1-4) comprising: an error estimation unit (1901) for estimating an error of an output signal (101S) of the waveform equalizer from the output signal, and outputting an error signal (1901S); and a coefficient updating amount calculation unit (103) for calculating a tap

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coefficient updating amount (106S) on the basis of the error signal (1901S), the step size (104S) and a data (105S) to be used for the tap coefficient update. The AAPA according to figure 19 does not disclose a step size decision unit for receiving the error signal and a step size upper limit value and a step size lower limit value being an upper limit value and a lower limit value of a step size as a step for the update of the tap coefficient, adaptively generating a step size which corresponds to the error signal in a range of the step size upper limit value or smaller and the step size lower limit value or larger, and outputting the generated step size. However, Love teaches a waveform equalization controller having a step size decision (fig. 3, refs. 17-19; col. 5, lines 26-33) unit for receiving the error signal (col. 5, lines 9-15) and a step size upper limit value (col. 5, lines 23-25; "upper-mu") and a step size lower limit value (col. 5, lines 20-23; "lower-mu") being an upper limit value and a lower limit value of a step size as a step for the update of the tap coefficient (col. 5, lines 9-37), adaptively generating ("integrating up/integrating down) a step size which corresponds to the error signal in a range of the step size upper limit value or smaller and the step size lower limit value or larger, and outputting the generated step size. Love teaches that the larger step size is advantageously utilized during times of large doppler spread for faster convergence during a moment of large error. Thereby, convergence is achieved more rapidly. Alternatively, Love teaches that a smaller update size is used under conditions of small doppler spread or low error thereby providing only slight updates to the channel estimator coefficients. The system taught by Love would allow for fast convergence of equalizer coefficients during a time of large error and less chance of divergence during

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a period of low error. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the step size decision unit as taught by Love in the system of the AAPA because it would allow for fast convergence of equalizer coefficients during a time of large error and less chance of divergence during a period of low error.

Regarding claim 25, the AAPA discloses by figure 19 a waveform equalization control method for controlling update of a tap coefficient of a filter included in a waveform equalizer for reducing a transmission line distortion of an input signal on the basis of LMS algorithm (fig. 19; specification pgs. 1-4) comprising: an error estimation step (1901) of estimating an error of an output signal (101S) of the waveform equalizer from the output signal, and generating an error signal (1901S); and a coefficient updating amount calculation step (103) of calculating a tap coefficient updating amount (106S) on the basis of the error signal (1901S), the step size (104S) and a data (105S) to be used for the tap coefficient update. The AAPA according to figure 19 does not disclose a step size decision step of adaptively deciding a step size in a range of a step size upper limit value as an upper limit value of a step size which is a step for the update of the tap coefficient or smaller, and a step size lower limit value as a lower limit value of the step size or larger, on the basis of the error signal. However, Love teaches a waveform equalization method having a step size decision (fig. 3, refs. 17-19; col. 5, lines 26-33) step receiving the error signal (col. 5, lines 9-15) and a step size upper limit value (col. 5, lines 23-25; "upper-mu") and a step size lower limit value (col. 5, lines 20-23; "lower-mu") being an upper limit value and a lower limit value of a step size as a

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step for the update of the tap coefficient (col. 5, lines 9-37), adaptively generating ("integrating up/integrating down) a step size which corresponds to the error signal in a range of the step size upper limit value or smaller and the step size lower limit value or larger, and outputting the generated step size. Love teaches that the larger step size is advantageously utilized during times of large doppler spread for faster convergence during a moment of large error. Thereby, convergence is achieved more rapidly. Alternatively, Love teaches that a smaller update size is used under conditions of small doppler spread or low error thereby providing only slight updates to the channel estimator coefficients. The method taught by Love would allow for fast convergence of equalizer coefficients during a time of large error and less chance of divergence during a period of low error. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the step size decision step as taught by Love in the method of the AAPA because it would allow for fast convergence of equalizer coefficients during a time of large error and less chance of divergence during a period of low error.

#### ***Allowable Subject Matter***

10. Claims 2-4 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***



11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art of record is cited to further show the state of the art with respect to adaptive step size waveform equalizers.

U.S. Pat. No. 5684827 to Nielsen.

U.S. Pat. No. 5276707 to Baum.

U.S. Pat. No. 5953380 to Ikeda.

U.S. Pat. No. 5914983 to Bowser et al.

U.S. Pat. No. 5710792 to Fukawa et al.

U.S. Pat. No. 5654765 to Kim.

U.S. Pat. No. 5644595 to Yamasaki et al.

U.S. Pat. No. 5524023 to Tsujimoto.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (703) 305-0374. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

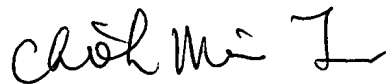
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason M. Perilla  
July 15, 2004

jmp



CHIEH M. FAN  
PRIMARY EXAMINER